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The Pragmatic Development of Humor

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## Abstract

Humor development is underpinned by children's pragmatic abilities. This chapter will highlight the link between humor and pragmatics, demonstrating that understanding contexts and intentions is often key to interpreting humor. It will also discuss different theories of humor processing, including incongruity theories, behavioral theories, and pragmatic theories based on Grice's maxims and Relevance Theory. This chapter will detail research about the development of humor appreciation and production from infancy through adolescence, including children's understanding of the pragmatics involved in joking. Finally, research on the development of humor in children with autism and Asperger syndrome will be examined, highlighting that humor is more difficult for children with pragmatic difficulties.

Keywords: Humor; Incongruity; Grice; Relevance Theory; Non-literal; Intention; Comprehension; Production; Autism; Asperger syndrome;

## The Pragmatic Development of Humor

This chapter will demonstrate that humor development is underpinned by children's pragmatic abilities. The following sections will (1) highlight the link between humor and pragmatics, (2) discuss different theories of humor processing, (3) discuss research on humor development, and (4) discuss research on the development of humor in children with autism and Asperger syndrome.

### Humor and Pragmatics

Humor highlights a central aspect of pragmatics – that context and intentions are important in understanding utterances, above and beyond literal meaning alone. Consider a very basic joke, such as mislabeling an object (e.g., calling a cat a dog). Relying only on the literal meaning of the utterance does not properly communicate the message. An adult addressee might think a mistake was made, perhaps stemming from the selection of an unintended referring expression, which would lead to a breakdown of communication. A toddler could take the same view, or, given that they are constantly learning about the world, might take the utterance to mean that cats are literally called dogs. If we add a pragmatic layer, such as the intention to be humorous, and allow the audience to consider cues such as laughter to indicate this, the utterance takes on a new meaning – that of a joke, where saying something wrong communicates amusement. Thus pragmatic meaning, or the intended rather than literal meaning, is essential in communicating humor.

For more complex jokes including spoken puns, such as “Police were called to a daycare where a 3-year-old was resisting arrest/a rest”, considering only one literal meaning would lead to a breakdown of communication; for example, why would a 3-year-old be arrested? However, by considering the intention to be humorous, one can combine the two meanings and a joke can be interpreted instead.

Humor involves creating implausible or ambiguous literal meanings which can be interpreted as amusing. There are other situations in which literal meanings are not always enough on their own, and for which pragmatic interpretations can help. These include pretense, irony, and metaphor (e.g., Filippova, in press, this volume; Hoicka, Jutsum, & Gattis, 2008; Pouscoulus, in press, this volume; Rakoczy, Tomasello, & Striano, 2004). Children understand pretense from the second year (e.g., McCune-Nicolich, 1981), various degrees of metaphor from 3 to 10 years (e.g., Gottfried, 1997; Pearson, 1990), and various degrees of irony from 4 to 10 years (e.g., Pexman & Glenwright, 2007; Recchia, Howe, Ross, & Alexander, 2010). What humor research adds is that children can learn about pragmatics in relation to literal ambiguities as early as the first year (e.g., Mireault, et al., 2012; Reddy, 2001; Sroufe & Wunsch, 1972). This early development may be due to several factors. First, humor takes both physical and verbal forms, allowing children to consider pragmatics even before their verbal skills take off. For example, infants could see putting a sock in one's mouth as a correct act or a mistake, depending on their knowledge of the concept "sock". However when accompanied by laughter, infants can interpret the act as humorous, giving the act a new pragmatic meaning of a joke. Thus pragmatics may develop before other aspects of language.

Second, the pragmatic interpretations that turn early humor production and comprehension into successful communications are relatively simple. Early humor points only to literal ambiguity, or wrongness of the act, paired with the intention to amuse (Hoicka & Gattis, 2008). Understanding pretense, irony, and metaphor is more complex. For example, one must also consider imagination in the case of pretense (Nichols & Stich, 2003). Irony involves considering complex mental states (e.g., Pexman & Glenwright, 2007). Finally, metaphor involves noticing literal overlaps between two concepts (e.g., Andrews, Rosenblatt, Malkus, Gardner, & Winner, 1986).

Third, using pragmatics to overcome literal ambiguity via humor could be more socially and emotionally rewarding than using pragmatics to understand pretense, irony, or metaphor. For example, the amygdala shows stronger activation for jokes suggesting positive rewards (e.g., Bekinschtein, Davis, Rodd, & Owen, 2011). This in turn could provide motivation to give a pragmatic meaning to a literal ambiguity, which may not always be present for pretense, irony, or metaphor. Humor may thus be one of the first instances in which children learn about pragmatics, and upon which more complex forms, such as irony, may build.

### Humor Theories

Several theories explain how we process humor. These include non-pragmatic theories, such as incongruity and behavioral theories, and pragmatic theories, such as Gricean and Relevance Theories. Incongruity theories suggest we find humor in incongruities, where incongruity, at its most basic, is a discrepancy between what is expected and what actually occurs (e.g., Attardo, 1997; Deckers & Kizer, 1975; McGhee, 1979; Nerhardt, 1976; Shultz, 1974, 1976). Deckers and Kizer (1975) tested whether incongruity predicted humor appreciation. Participants were given 0, 11, or 22 trials in which they compared a weight weighing 90 grams to weights ranging between 80 and 100 grams. Participants were then asked to compare the 90 gram weight to a 90, 270, or 630 gram weight. Participants' facial expressions were coded for humor (smiling or laughter). They found that the more judgments made prior to the test trial, the more humorous the participants found the comparison. Furthermore, the heavier the weight, or more distant from the expected weight, the more humorous the participants found the comparison. Deckers and Kizer suggested an increase in incongruity increases humor response, and this only occurs if an expectation has been created.

Behavioral theories focus on laughter to identify when humor has been appreciated, without regards to cognitive or socio-cognitive processing. For example, several observational researchers have identified humor by noting when toddlers laugh (e.g., Johnson & Mervis, 1997; Loizou, 2005). Additionally, Hoicka and Akhtar (2012) found toddlers' incongruous acts were more likely to be accompanied by laughter than their typical acts, suggesting laughter can be used as an identifier of humor to some extent.

The above theories leave out an important aspect – the speaker's intentions. For example, just because a sentence is incongruous does not mean the sentence was meant to be a joke – the speaker may have made a mistake, could be lying, pretending, or may hold a false belief (Hoicka et al., 2008). Similarly, laughter can occur for a variety of reasons that do not involve humor, such as tickling, laughter contagion, and due to banal comments (Provine, 1992, 2004). Additionally, felt humor and laughter vary widely, from very strong correlations to negative correlations, due to various factors such as the type of humor (Ruch, 2005). Again, what is important is that to 'get' humor, it helps to understand the speaker's intention.

Grice's Cooperative Principle and the attendant maxims (Quantity, Quality, Relation, Manner; Grice, 1989) suggest that people give an appropriate amount of information that is genuine, related to the conversation, and clear. Grice further suggests that if any of the maxims are violated, the listener can assume that the speaker is nonetheless being cooperative and intended for them to draw an inference (a conversational implicature) about their departure from the expected form. For example, non-literal speech, such as irony and metaphor, involves violating the maxim of Quality (try to make one's contribution one that is true), e.g., saying "Your room is a pig sty". By violating the maxim of Quality while holding to the Cooperative Principle, another meaning, (e.g., that one's room has the features of a pig sty, i.e., dirtiness) is implied (Grice, 1989).

Pragmatic theories have attempted to account for humor. Attardo (1993) notes that all of Grice's maxims, and even more than one maxim at a time, can be violated to lead to a joke. For example, one could violate the maxim of Quantity (Attardo, 1993, p.541):

"Excuse me, do you know what time it is?"

"Yes."

Or the maxim of Manner (Attardo, 1993, p.542):

"Do you believe in clubs for young men?"

"Only when kindness fails."

However Attardo (1993) points out that in joking, one intends not only to violate conversational maxims, but also to flout the Cooperative Principle in general. The speaker chooses not to respond to the literal question asked, violating the Cooperative Principle. Thus Attardo (1993) points out a paradox – jokes are communicative, despite violating the Cooperative Principle.

Variations on Grice's Cooperative Principle and the attendant maxims have incorporated intention to explain how a joke could be a successful communication. For example, Grice (1989) noted that rules are needed in the case of non-natural communication, where the intended meaning does not match the literal meaning. This could include jokes. As non-natural communication, by definition, violates the main conversational maxims of Quality, Quantity, Relation, and Manner (Grice, 1989), non-natural communication could never be successful without further refinements. Grice made an attempt to account for non-natural communication by considering the utterer's meaning and intentions, such that (Grice, 1989, p. 92):

"U meant something by uttering x" is true iff, for some audience A, U uttered x intending:

(1) A to produce a particular response r



- (2) A to think (recognize) that U intends (1)
- (3) A to fulfill (1) on the basis of his fulfillment of (2)

Thus in the case of a joke, such as calling a hat a shoe, the utterer means that it is not a shoe, intending the audience to laugh, intending the audience to recognize that the utterer intends the audience to laugh, and intending that the audience laughs because the utterer wanted the audience to laugh. It is also important to note that Grice left open the meaning of utterance to include not only verbal utterances, but also non-verbal communicative acts.

Raskin (1985) put forward the Semantic-Script Theory of Humor (SSTH) which stipulates that a joke is (1) compatible with two different scripts, (2) the two scripts are opposite, and (3) the joke follows four maxims for the cooperative principle of non-bona-fide communication (Raskin, 1985, p. 103):

- (1) Quantity: Give as much information as is necessary for the joke
- (2) Quality: Say only what is compatible with the world of the joke
- (3) Relation: Say only what is relevant for the joke
- (4) Tell the joke efficiently.

These alternative maxims allow jokes to be communicative even when they violate Grice's Cooperative Principle. What is important to note is that embedded in this theory is the signalling of a joking context, which in turn, could be interpreted as a humorous intention.

Another major account of pragmatic meaning, Relevance Theory (Sperber & Wilson, 1995), suggests that listeners process utterances only once, knowing the utterance is relevant to them, as speakers must follow the principle of relevance. Listeners can use the context and speaker's intention to interpret the meaning that is most relevant to them – a meaning that leads to greater positive cognitive effects, and avoids cognitive effort.

In the case of non-literal language, it is important to consider how the utterance relates to the speaker's attitude. Thus an utterance could be processed as, for example, ironic, if the speaker's attitude is expressed towards the utterance (echoic), and if that attitude is dissociated from the utterance (e.g., Sperber & Wilson, 1981; Wilson & Sperber, 1992). For example, if a 7-year-old was given 20 pounds, and said, "I'm rich!" we might assume that what he says is literal. His attitude is presumably not dissociated from his utterance – 20 pounds is a lot of money for a 7-year-old! However if a 30-year-old was in debt by £20,000, and was given 20 pounds, and also said, "I'm rich!" then we can interpret this as ironic. The sentence echoes a perhaps previously unsaid sentence, reflecting a cultural norm of what is considered "rich", which does not involve a debt of £19,980. However his real attitude is that he is still broke, which is dissociated from what he said. By considering speakers' attitudes from the start, listeners can process sentences only once to assess the overall meaning.

Yus (2003) has extended Relevance Theory to processing humor. He suggests we process humorous sentences already knowing that the intention behind them is to be humorous. Thus the speaker will signal a humorous frame. The frame could be signalled by cues, such as laughter or previous joking, or the form of the joke.

In the same vein, developmental psychologists have considered social cognition to be an important part of humor (e.g., Reddy, 2001). For instance, to detect humor, and know that an act or utterance is not a mistake, one must understand intentions to be humorous, or at the very least, notice cues which indicate that the act or utterance could be humorous (e.g., Hoicka & Gattis, 2008; Leekam, 1991).

Since several types of acts, such as pretending, lying, and using metaphor, also involve saying intentional falsehoods, an even more complex understanding of social cognition is needed to distinguish humor from these other forms. For example, jokes differ from lies in that, while both are intentional, the second order intentions differ such that jokes

are not intended to be believed, while lies are (Leekam, 1991). Tracking others' knowledge can also help determine when someone is joking. For example, saying a falsehood knowing that the other person knows it is false would indicate a joke, while saying a falsehood knowing that the other person does not know it is false would indicate a lie (Sullivan, Winner, & Hopfield, 1995). Thus, like pragmatic theories, socio-cognitive theories suggest that one cannot simply rely on incongruity to detect humor, mainly because falsehoods can be said for a variety of reasons. Instead, both socio-cognitive and pragmatic theories rely on the joke being framed in such a way (e.g., through intention cues, prior knowledge) to show it is a joke.

### Humor Appreciation

An important aspect that much developmental psychology research on humor development misses (e.g., Loizou, 2005; McGhee, 1979; Shultz, 1974, 1976; Sroufe & Wunsch, 1972) is that detecting jokes is a pragmatic, or socio-cognitive process. While even infants appreciate humor, it is not clear that they understand the pragmatic meaning behind jokes. They could just as easily laugh at a mistake, which would miss the actor's or speaker's pragmatic message, and which would show a lack of pragmatic-communicative skills. Recent research has begun to examine whether young children not only appreciate humor, but also understand the communicative intentions of the joker.

Humor appreciation begins in the first year of life, and tends to be in response to non-verbal stimuli. Sroufe and Wunsch (1972) looked at the types of stimuli that made infants laugh. Mothers presented auditory stimuli (e.g., mother using a squeaky voice), tactile stimuli (e.g., bouncing baby on knee), social stimuli (e.g., cloth in mother's mouth), and visual stimuli (e.g., mother crawling on floor) to their infants. They recorded when 4- through 12-month-olds laughed at each type of stimulus. They found that 4- to 6-month-olds laughed

10% of the time, 7- to 9-month-olds laughed 37% of the time, and 10- to 12-month-olds laughed 43% of the time. They also found that 7- to 9-month-olds laughed more than 10- to 12-month-olds at auditory and tactile stimuli, while 10- to 12-month-olds laughed more than 7- to 9-month-olds at social and visual stimuli. They suggested that what makes infants laugh is in line with their cognitive development, as infants' vision and social interactions develop later than their tactile and auditory abilities.

Sinnott and Ross (1976) showed 3- to 8-year-old children puppet-acted scenarios. Children of all ages chose incongruous (e.g., puppet walking across the stage by bouncing on its head) and what the researchers called aggressive (e.g., puppet walking across, tripping, and falling on its face) scenarios significantly more often than neutral scenarios (e.g., puppet walking across waving) as most humorous. However no difference was found between the aggressive and incongruous scenarios. They suggest both incongruity and aggression are factors in children's humor appreciation. However aggression could be seen as socially incongruous in these scenarios. For example tripping and falling on one's face is something unexpected by the puppet.

While up to 3 years, toddlers tend to appreciate jokes that involve incongruity (i.e., something out of the ordinary or nonsensical) children start to appreciate what is termed resolution from 4 years, where resolution allows one to reframe an image or utterance so that it makes sense in a new context. Pien and Rothbart (1976) presented cartoons to 4- and 5-year-olds. These cartoons either contained incongruity and resolution, or were altered to contain incongruity alone. Children found cartoons containing both incongruity and resolution funnier than cartoons containing incongruity only. This ability is a pre-requisite for the Semantic-Script Theory of Humor (Raskin, 1985), as the SSTH involves recognising two opposing scripts within the same act or utterance.

When humor is verbal, rather than visual, children do not understand resolution until 8 years. Shultz (1974) showed three forms of a pun-based joke to 6- to 12-year-olds. The first form allowed one to notice incongruity as well as resolve the answer to the joke. The second form allowed one to notice incongruity, but did not provide a resolution. Finally, the third form contained no incongruity, but did allow resolution, e.g., (Shultz, 1974, p. 101).

Why did the cookie cry?

A.Because its mother was a wafer so long. (Incongruity + Resolution)

B.Because its mother was a wafer. (Incongruity)

C.Because he was left in the oven too long. (Resolution)

Shultz found that while children 8 years and above found jokes containing both incongruity and resolution to be funnier than jokes containing incongruity or resolution alone, 6-year-olds found jokes containing incongruity equally funny, regardless of whether or not they contained resolution.

The above research shows what types of humor children appreciate, following behavioral and incongruity theories of humor. While research considering humor development from a pragmatic viewpoint is limited, the research to date is discussed below.

Hoicka and Wang (2011) found that 15-month-olds differentiate humorous and sweet vocal cues, and meaningfully match these vocal cues to the appropriate actions. In one condition an experimenter gave sweet vocal cues (“Aww!” plus a sentence said with sweet intonation, i.e., lower, quieter, faster compared to humor, with a falling statement-like contour; following Hoicka & Gattis, 2012). When infants heard the sweet vocal cues they looked longer when the experimenter performed a humorous action (e.g., rubbing a toy cat on her head) versus a sweet action (e.g., stroking the toy cat); perhaps not surprising since the humorous action was quite unexpected. However, in a second condition an experimenter gave humorous vocal cues (laughter plus a sentence said with humorous intonation; i.e.,

higher, louder, and slower compared to sweet, with a rising question-like contour; following Hoicka & Gattis, 2012). When infants heard humorous cues they looked longer when the experimenter performed a sweet versus humorous action. Thus, infants were not surprised by strange actions *per se*. Rather, they were surprised when a person's actions did not follow their communicative cues. This suggests that from 15 months infants use humorous cues to create a humorous frame in which to interpret the pragmatic meaning of subsequent acts. Infants may thus expect people to intentionally act humorously after giving humorous intentional cues.

Hoicka and Gattis (2008) found toddlers use laughter to infer that someone intentionally did the wrong thing. An experimenter modelled abnormal actions on objects (e.g., drinking from an upside-down cup) and said either "Whoops! Now you try" or "[laughs]. Now you try". From 25 months, children copied the actions accompanied by laughter more often than those accompanied by "Whoops!" and corrected actions accompanied by "Whoops!" more often than those accompanied by laughter. Thus from 25 months, toddlers use laughter to give the act a pragmatic meaning of "joke".

Shifting to verbal jokes, Hoicka and Akhtar (2011) found that if experimenters mislabeled objects (e.g., calling a cup, "oogle boo"), toddlers from 30 months of age mislabeled objects more often when experimenters laughed versus when they gave sincere expressions, (e.g., "There!"). This study dismisses the possibility that toddlers simply responded to unintentional markers (e.g., Whoops!). Thus from 30 months, toddlers use laughter to interpret the pragmatic meaning of verbal jokes.

When comparing joking to ignorance, children as young as 3 years understand that jokers know the truth, but choose not to tell it (Hoicka, Butcher, Malla, & Harris, 2013). Three- to 5-year-olds watched one actor mislabel common objects (e.g., cup) while showing that she was joking (laughing, using a humorous intonation pattern, saying "I'm joking!"),

while another actor mislabeled objects while displaying ignorance (shrugging shoulders, saying, “I don’t know”). When children were shown novel objects, and each actor labeled the object with a novel word while being sincere, children trusted the previous joker over the previously ignorant speaker, and also judged that the previous joker knew the answer, while the previously ignorant actor did not. This was not due to children simply preferring the joker, or due to ignorance cues, as demonstrated by control conditions.

Research using open-ended questions found similar results. In a study of 2- and 3-year-olds, a speaker labeled objects falsely (e.g., calling a cup a shoe), and then the experimenter asked the children why the speaker had said that (Baron-Cohen, 1997). Most children reported mental states, often suggesting pretending or joking to explain the false label. Baron-Cohen’s study highlights that there are several reasons why children could think we might make falsehoods. To be certain that children have a pragmatic understanding of humor *per se*, and not just intentional falsehood, it is also important to determine whether children distinguish pragmatic meanings behind different types of falsehood, such as pretense, joking, lying, and metaphor.

One way in which children track the pragmatic meaning of joking is through whether the person intends for a falsehood to be believed. Leekam (1991) tested 6- through 9-year-olds on a story-based task in which a child falsely told his mother he made a painting either as a lie (not intending his mother to know the truth), or as a joke (intending his mother to know the truth). Children who distinguished jokes from lies also distinguished the second-order intentions of the speaker, suggesting that understanding second-order intentions is important to determine the exact pragmatic meaning of a falsehood.

Children also acknowledge that what other people know or do not know affects whether they are joking or lying. Sullivan, et al. (1995) read two stories to 5- to 8.5-year-old children. In one story, a child lies, e.g., he says he has drawn a picture that he has not drawn,

knowing that his mother does not know the truth. In the other story, a child jokes, e.g., he says he has drawn a picture that he has not drawn, knowing that his mother knows the truth. They found that children's understanding of second-order ignorance (understanding whether or not someone is aware of another person's knowledge) was imperative to understanding whether the child was lying or joking. Thus children from around 5 years can use second-order intentions and knowledge states to determine whether the pragmatic meaning behind a falsehood was a joke or lie.

Recent research suggests that even toddlers are sensitive to differences between joking and pretending (Hoicka & Butcher, 2013). When parents said falsehoods (e.g., that a sponge or a toy chicken was a shoe) to joke or pretend, toddlers were more likely to endorse the actions that went with the false labels (e.g., putting the sponge or toy chicken on their foot) when parents were pretending versus joking.

Thus children appreciate humor from the middle of the first year, and the types of humor that children appreciate change as they get older, reflecting cognitive and linguistic development. However, it is also important to consider when children understand that falsehoods are meant as jokes, as this indicates that children not only notice falsehoods, but also understand the pragmatic meaning conveyed by the speaker or actor. This begins as early as 15 months (Hoicka & Wang, 2011), and progresses through 6 years (e.g., Leekam, 1991).

### Humor Production

According to parent reports, humor production starts in the first year, with most infants producing peek-a-boo jokes (Hoicka & Akhtar, 2012). Parents reported that 87% of 8- and 11-month-olds and 100% of 14-month-olds "clowned", that is, they deliberately repeated actions to re-elicite laughter from others (Reddy, 2001). Such actions included screwing up the



face, wobbling the head, squeaks, splashing, teasing and copying others' actions (such as grandma snoring).

After the first birthday, most toddlers engage in funny actions, like pulling faces, and tickling or chasing others, according to parent reports (Hoicka & Akhtar, 2012). Toddlers in the second year have also been observed to make a variety of jokes such as looking through their legs, mis-pronouncing words, and putting all types of things in their mouths (sand, sponges, Loizou, 2005). From 19 months, toddlers copy jokes in which objects are misused, e.g., putting a boot on their hand (Hoicka & Gattis, 2008). One case study suggested that a 1-year-old mislabeled objects, and even made puns (Johnson & Mervis, 1997).

From 2 years, parents report that most children produce novel jokes (Hoicka & Akhtar, 2012). Most children's joke repertoires expanded to include misusing objects, making incongruous statements (e.g., that dinosaurs lick the wall, or that dogs have three tails), and taboo topics (e.g., many poo jokes, Hoicka & Akhtar, 2012). From 2 years, children make novel jokes involving mislabeling in experimental settings (e.g., calling a cup, "goojooboojoo", Hoicka & Akhtar, 2011). From 3 years, parents report most children mislabel as a joke (Hoicka & Akhtar, 2012). Like humor appreciation, early research on humor production tends to be tied to cognitive and linguistic development, rather than pragmatic development.

While research on humor production in older children does not focus on when different types of humor production emerge, research suggests that children continue to produce novel varieties of humor. Socha and Kelly (1994) asked children from 4 to 13 years what they might say to a friend or teacher who was sad to make them laugh. Four- to 8-year-olds primarily made jokes which violated language or logical norms, e.g., "How does a chef make pasta? He uses his noodle." From 9 to 13 years children produced more jokes that

constituted decorum violations (e.g., defecation jokes), and politeness violations (e.g., sexist jokes).

A naturalistic study of 10- to 12-year-olds found that children produced a variety of humor types (Sanford & Eder, 1984). These included memorized jokes, which children shared with large, less familiar groups. Funny stories were shared amongst close friends. Practical jokes were played on close friends to increase bonds, but were played on acquaintances for bullying purposes. Finally, humorous behavior was carried out amongst small groups of girls to express taboo topics (e.g., sex).

As in the case of humor appreciation, it is also important to consider when children intend to produce jokes. Thus we can consider whether children can convey the pragmatic meaning of joking. While little research exists on this, recent research suggests this could be as early as the first year. Parents report that infants cue their jokes with laughter, smiling, and looking for a reaction from the first year (Hoicka & Akhtar, in 2012).

In observational research, 2- and 3-year-olds were significantly more likely to laugh, either with or without looking for a reaction, and significantly more likely to smile while looking for a reaction when producing incongruous versus normal actions and utterances with their parents (Hoicka & Akhtar, 2012). This suggests that toddlers were trying to communicate their falsehoods to their parents as humorous. Observational research also suggests that 3- to 5-year-olds were more likely to laugh when making an intentional versus incidental falsehood with their peers (Bainum, Lounsbury, & Pollio, 1984). Finally, experimental evidence found that 36-month-olds were more likely to laugh when mislabeling versus correctly labeling objects (Hoicka & Akhtar, 2011). Thus early on, children signal their jokes with laughter, smiling, and looking for a reaction, suggesting they are communicating their act as humorous to their audience, demonstrating an awareness of contextualising their jokes.

## Origins of Humor

Research suggests that both genetic factors and family environments play a role in forming people's sense of humor. A twin study found that genetic factors account for the appreciation of aggressive humor, while family environment accounts for the appreciation of nonsense, satire and sexual humor (Wilson, Rust, & Kasriel, 1977). In contrast, a larger study of American twins found that affiliative (e.g., telling canned, or rehearsed, jokes) and self-enhancing (noticing the funny things in life) humor were linked to genetic effects, while aggressive (making fun of others) and self-defeating humor were linked to family environments (Vernon, Martin, Aitken Schermer, & Mackie, 2008). However another large study of British twins found that all humor types linked to genetics, and not family environment (Vernon, Martin, Aitken Schermer, Cherkas, & Spector, 2008). Finally, an adoption study found that genetic factors dictated adolescents' use of humor with friends, but not families (Manke, 1998). Across all of the above studies, it was also clear that non-shared environmental factors had great effects on types and sharing of humor. While this body of research gives us some (conflicting) clues about how genetics and family environments affect the development of sense of humor, it does not tell us how we learn about the overall pragmatic meaning of jokes, regardless of humor style.

An increasing body of research in developmental psychology suggests that parents scaffold infants' appreciation and production of humor early on. From around 7 months, parents report that infants repeat incongruous actions when parents laugh (Reddy, 2001). Thus laughter can signal to infants that their actions are non-serious and enjoyable. Longitudinal, observational research suggests that parents gradually scaffold their infants' early clowning using a variety of cues (Mireault, et al., 2012). Researchers asked parents to "Do whatever you normally do to make your baby laugh or smile" at 3, 4, 5, and 6 months.

When parents tried to make their infants laugh or smile, they tended to perform clowning behaviors, such as pulling faces, and they paired this with cues such as laughter and smiling. Infants laughed and smiled in response both to parents' clowning and to their cues, and this increased with age. Similarly, when infants clowned, parents responded in kind by smiling and laughing, or by clowning themselves, which increased with age. This suggests that while infants might not fully grasp humor at 3 months, parent-infant interactions scaffold their appreciation and production of humor. Thus infants come to learn which actions, paired with humorous cues, have the pragmatic meaning of "humorous".

Parents provide numerous cues to support toddlers in understanding when they are being humorous. For example, parents give linguistic and acoustic cues to mark when they are being funny versus sincere. Parents reading funny books to their 19- to 24-month-olds used more abstract language, that is, language referring to events outside the current context. They also used more disbelief language, that is, language which suggests they should not believe the joke. For instance, when parents read a joke such as "Mummy drinks baby's bottle" parents said things like, "That's not right" or "Who should drink the bottle?" (Hoicka, et al., 2008). Furthermore, when parents read jokes, they used more features of infant-directed speech and used a rising linear contour which sounded like a question (Hoicka & Gattis, 2012). This suggests that parents made it easier for children to pay attention and notice a joke had been made, specifically framing the joke to help children notice it was a joke, and more specifically, what made it funny. Thus parents signal that the literal content of sentences like, "Mummy drinks baby's bottle" should not be taken seriously. Rather, the pragmatic context dictates that it is a joke.

A series of studies has further examined how parents cue humor to their toddlers, comparing humor not only to literal, but also pretense speech (Hoicka & Butcher, 2013). In these studies, the target sentences were always matched across conditions so that the literal

meanings stayed the same, but the pragmatic meanings varied. In one study parents read a book to their 15- to 21-month-olds in which the set-up of each page denoted a joking, pretending, or literal context, each followed by a target sentence that was the same across different versions of the book. In a play task with 16- to 20-month-olds, parents said a target sentence (e.g., “I’m having a drink”) which corresponded to a literal action (drinking), a pretend action (putting empty cup to mouth), or a joke action (putting cup to elbow). In a third task with 20- to 24-month-olds, parents said a target sentence (e.g., “This is a shoe”) in which they either literally labeled the object they were playing with (shoe), demonstrated pretense (e.g., sponge), or joked (e.g., toy chicken). Across all three studies, parents showed more disbelief through their language and actions when joking compared to when they pretended or played literally. For example, they were most likely to say things like, “That’s not a shoe” in response to the same target sentence (“This is a shoe”) in the joking condition. Parents were also more likely to perform non-shoe actions (e.g., putting the object on their head) in the humorous condition. Thus parents used actions and utterances to convey different pragmatic meanings for the exact same sentences, even signalling differences between joking and pretending, which are only subtly different. Additionally, toddlers showed more disbelief through their actions during joking contexts, and toddlers in the object mislabeling task were more likely to express their disbelief verbally by saying, “No” most often during joke trials. These results can be interpreted as suggesting that toddlers picked up on the different pragmatic meanings of joking, pretending, and literal utterances.

### Autism and Asperger Syndrome

Autism is a disorder characterized by poor communication skills, social cognition, and understanding of pragmatics (e.g., Baron-Cohen, Leslie, & Frith, 1985; Perner, Frith, Leslie, & Leekam, 1989). As humor relies on understanding pragmatics and social cognition,

it is not surprising that children with autism and Asperger syndrome find difficulties in appreciating and producing humor, specifically in a social or communicative context.

Research on adults with Asperger syndrome found that they were just as likely to appreciate jokes based on visual puns as typical adults (Samson & Hegenloh, 2009). However they were less likely to appreciate semantic jokes, and even less likely still to appreciate jokes which relied on recognising false beliefs in others, than typical adults. The authors suggested that this was because adults with Asperger syndrome did not benefit from additional social cues to humor, while typical adults did. Thus while adults with Asperger syndrome appreciate humor, this is due to incongruity more generally, and not due to the communicative intentions of the joker. Further research found that children with high-functioning autism and Asperger syndrome were less able than typically developing children to appreciate humor which was based on incongruity alone, perhaps suggesting that social cues could even help children to understand these types of jokes (Emerich, Creaghead, Gretha, Murray, & Grasha, 2003).

Reddy, Williams, and Vaughan (2002) compared humor development in children with autism versus Down syndrome (DS), a disorder that does not affect affective engagement or social relations. They found that while children with autism laughed at tactile and slapstick humor as much as children with DS, they showed a distinct deficiency in responding to funny faces or socially inappropriate acts, laughing with others, or clowning, but an increase in unshared laughter. Thus while children with autism have some appreciation of humor, socially-based humor appears to be lacking. Furthermore, St. James and Tager-Flusberg (1994) found that children with autism created significantly fewer episodes of humor than children with DS. While not significant, when children with autism did create humor, the percentage of humor episodes that were clearly intentional were very low compared to children with DS.

Additionally, children with learning disabilities performed as well as typically developing children in determining that someone said a falsehood because they were pretending or joking (Baron-Cohen, 1997). However, children with autism did not tend to use mental states. Rather, they just emphasized that the label was wrong.

Thus, from early on, children with autism do not appear to process humor in the same way as typically developing children and children with learning disabilities. While engaged in humor from infancy through adulthood, their appreciation of humor tends to be of the non-social, non-pragmatic kind. They may find something funny if it violates their own expectations, but the pragmatic aspect of jokes - that they are intended by the joker - does not appear to be appreciated to the same extent by children and adults with autism or Asperger syndrome.

Children with autism and Asperger syndrome have deficits in relation to communication skills, social cognition, and pragmatics. They also have specific problems processing the pragmatic aspects of jokes. Thus this body of research further highlights that typical pragmatic development may be important to typical humor development.

### Future Directions

Research on humor development is in short supply, and there is even less research on humor development in relation to pragmatics. One key area that needs more research is when and how children come to understand the communicative intentions behind humor. Simply appreciating or producing humor does not get at one of the core aspects of humor – that it is generally a shared communicative event. Future research should use experimental methods to isolate how cues and context help children determine that an utterance is meant as a joke.

While this chapter has pointed out that pragmatic understanding is important in the development of humor, it is not clear which pragmatic theories best account for humor

development. Current research on humor development does not take into account, for example, whether children process Grice's maxims when interpreting jokes. However when considering humor in particular, pragmatic theories begin to merge. Grice (1989), Raskin (1985) and Yus (2003) all converge on a similar idea – that for a joke to be communicated effectively, the audience must know *a priori* that a joke was intended. For this to occur, the details of the theories are vaguely different. Grice stipulates that the speaker intends for the audience to know they are joking, while Raskin and Yus suggest the speaker signals a joke context or frame respectively. Future research should investigate this further.

This paper has hinted at further complications in investigating children's pragmatic understanding of humor – humor is not the only form of non-literal speech. Lying, pretending, irony, and metaphor are also non-literal (e.g., Hoicka, et al., 2008; Raskin, 1985). Part of understanding humor is understanding that a falsehood is intentional and creates amusement. To understand humor to its full extent, children must learn that the joker wants the audience to know that the falsehood is false, and for the audience to know that the speaker knows the utterance is false. Future research must further compare children's understanding of different types of falsehood to ascertain whether children really understand separate concepts like joking, pretending, lying, irony, and metaphor, or whether they only understand more general concepts like, "intentional falsehood".

Finally, given the socially and emotionally rewarding nature of humor, there are opportunities to use humor as a tool to teach children about non-literal language. For example, both typically developing children and poor language comprehenders took part in an intervention in which they discussed jokes marked by ambiguity with their peers. This led to better reading comprehension in both groups (Yuill, 2007, 2009). Future research should examine whether engaging with humor early on leads to an increase in children's ability to understand other forms of non-literal language such as metaphor and irony.



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